REMARKS

Claims 1-4, 6-14, and 16 are all the claims pending in this application. Applicants respectfully traverse the rejection. Withdrawal of the rejection and allowance of this application are earnestly solicited.

The Claims are Patentable Under 35 U.S.C. § 103

Claims 1-4, 6-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata et al. (US 2002/0155682).

The Examiner maintains the rejection of claims 1-4, 6-14 and 16 over Shibata et al.

The Examiner takes the position that thickness and composition ratio are both art-recognized result-oriented parameters, subject to routine experimentation and optimization.

Applicants respectfully disagree.

Instant claim 1, from which all claims directly or indirectly depend, recites that the first nitride semiconductor layer is composed of AlN; wherein the range for x1 (the Al content of the second nitride semiconductor layer) is ($0<x1\leq0.05$), and the range for x2 (the Al content of the third nitride semiconductor layer) is ($0 < x2 < 1$ and $x1 + 0.02 \leq x2$). That is, the Al content of the second nitride semiconductor layer is regulated to be lower than that of the third nitride semiconductor layer.

When x1 falls within the above-described range, the initial growth of AlGaN crystals constituting the third nitride semiconductor layer may be attained by means of the GaN growth mode. As a result, the dislocation density of the third nitride semiconductor layer can be reduced (see page 13, line 33 to page 14, line 1 of the present specification). That is, the Al content of the lower layer is regulated to be lower than that of the upper layer. This configuration results in the dislocation density of the upper layer as being reduced.

In contrast, Shibata discloses that the Al content of the second nitride semiconductor layer is controlled to be smaller than that of the first nitride semiconductor layer (see claim 3 of Shibata). Such a configuration is opposite that of the claimed invention, and does not suggest the present invention wherein the Al content of the lower layer is regulated to be higher than that of the upper layer.

For this reason alone, it is respectfully submitted that the present claims are patentable over Shibata. Namely, the Examiner's contention that the features of claim 1 would have been "optimized" from the "general conditions" of Shibata amounts to nothing more than an unsupported assertion of obviousness.

Also, as previously submitted in Applicants' Amendment filed December 24, 2008, when xl is *greater* than the above-described range, growth of the third nitride semiconductor layer is dominated by the AlGaN growth mode, and the dislocation density of the third nitride semiconductor layer is not reduced (see page 11, lines 15 to 28, of the specification).

Shibata nowhere discloses an upper limit for the Al content xl of the second nitride, nor a specific range for the Al content of the third nitride. For these additional reasons, Shibata fails to render obvious the features claimed.

Shibata merely discloses that island-shaped crystal portions are easily made by adjusting the compositions of the first and the second nitride, and thus the relation of $x1 \leq yl-0.1$ can be satisfied for the Al content x1 of the second nitride and the Al content yl of the first nitride (see [0046] and [0047] of Shibata). However, paragraph [0045] of Shibata also describes as desirable an Al content of the second nitride that is larger than the Al content of the first nitride. Thus, there is a contradiction in the disclosure of Shibata.

Further, as also previously submitted in Applicants' Amendment filed December 24, 2008, when the thickness of the first nitride semiconductor layer falls within the range of 0.005 to 0.5 μm, as specified in claim 1, the nitride semiconductor layers (including the second nitride semiconductor layer) grown atop the first nitride semiconductor layer exhibit excellent crystal morphology and improved crystallinity (see page 9, lines 10 to 15, of the specification). The first nitride semiconductor layer serves as a buffer layer and thus it is generally considered preferable that the first nitride semiconductor is thick. Hence, the claimed thickness of the first nitride semiconductor layer could not be obtained by routine experimentation.

In contrast, Shibata neither discloses or suggests a specific range for the thickness of the first nitride semiconductor layer. In Examples 1 and 2 of Shibata, the A1N film has a thickness of 1 μm as the first nitride semiconductor layer (see [0066] and [0069] of Shibata), which is outside the claimed range.

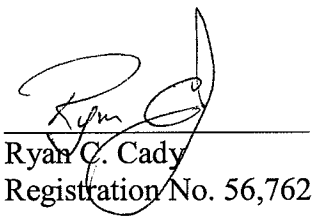
In view of the foregoing, Shibata does not disclose or suggest all the features of, and thus not have rendered obvious, the present invention.

Withdrawal of the rejection is earnestly solicited.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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